

[*High Vertical Resolution Antennas for NMR Logging*]

Abstract of Disclosure

A high vertical resolution antenna design is provided for use in an NMR measurement apparatus. Multiple coils are situated along the length of a magnet. A primary coil is energized to cause an oscillating magnetic field in a portion of earth formation surrounding a borehole. A secondary coil having smaller dimensions than the primary coil is operated to receive spin echoes from a depth of investigation associated with the secondary coil. A distance sufficient to minimize electrical coupling separates the coils. The separation distance can be reduced by selecting a secondary coil with orthogonal polarization to the primary coil. Alternatively, a cross coil configuration can be implemented where the orthogonal secondary coil at least partially overlaps the primary coil, thereby reducing the overall length necessary for the polarizing magnet.